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GB 2199501 A EP 0236104 A US 5127265 A

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(54) Cover for apertures in aircraft.

(57) A protective cover (2) for apertures in aircraft comprises a cover portion (6) surrounded by a fixing portion (5). A warning flag portion (7) extends radially outwardly from the fixing portion (5). The fixing portion (5) is provided with an adhesive layer by which the cover is attached to the skin of an aircraft.

The cover portion (6) is preferably transparent to assist aligning of the cover with the apertures to be covered. The cover (6) may be flat or may be profiled to receive a structure projecting from the skin of the aircraft. Such structures include pitot tubes (Figs 5, 6) and stall warning vanes.

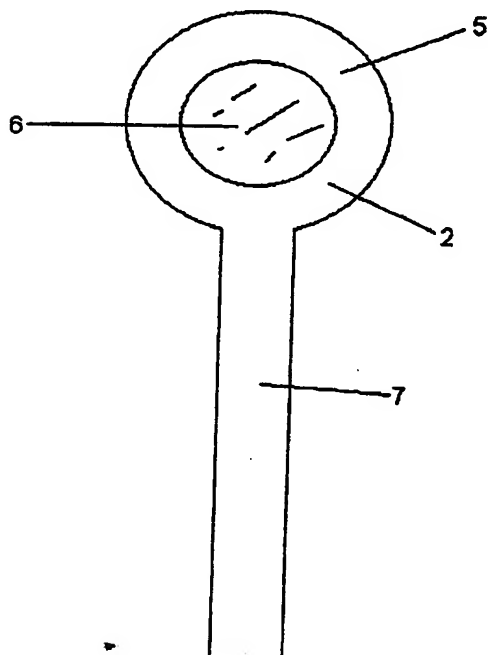


Figure 2

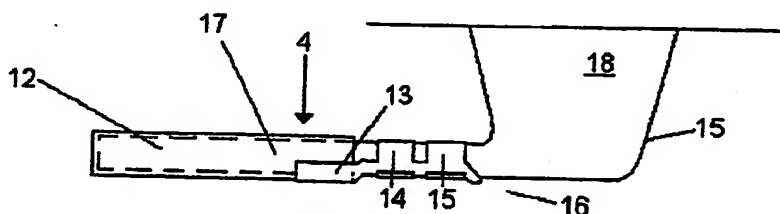
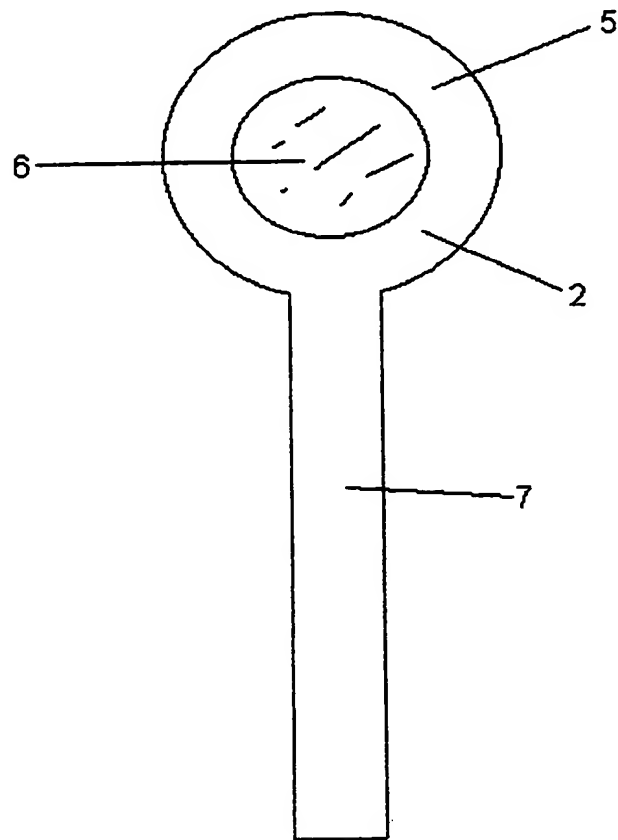
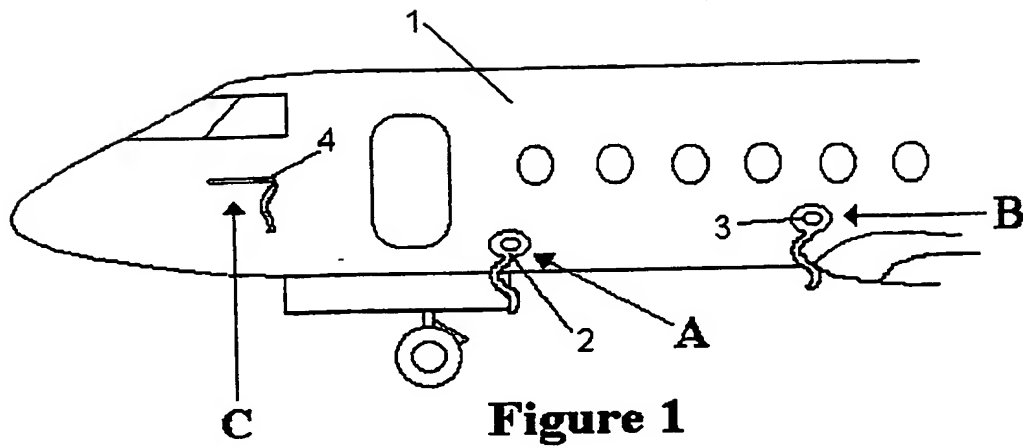


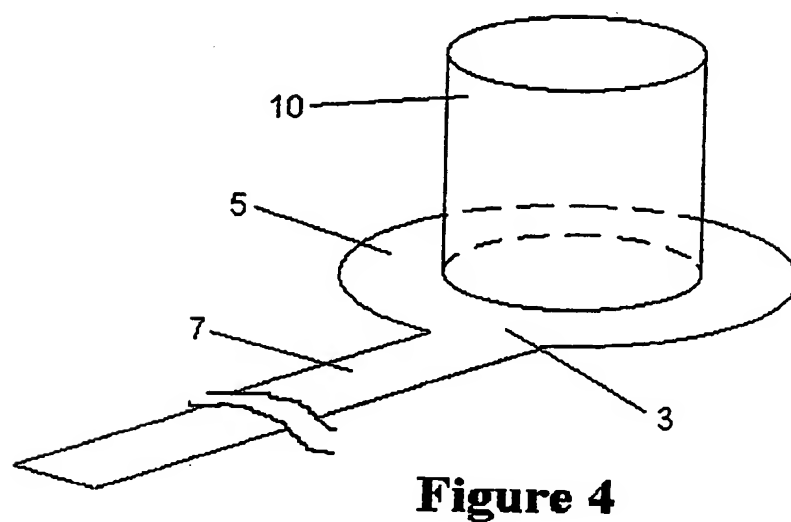
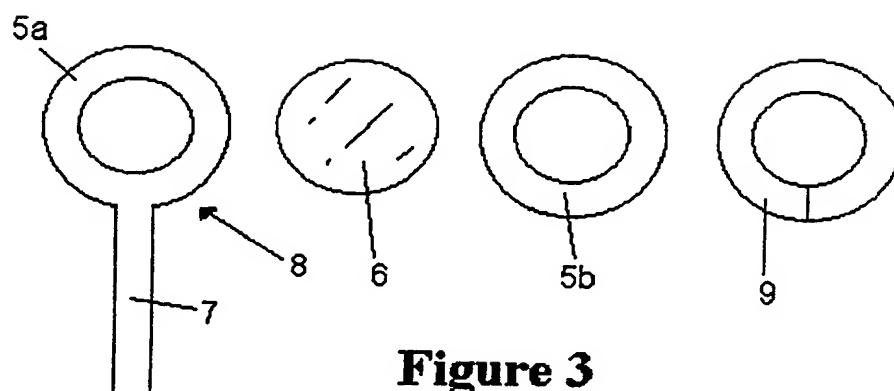
Figure 5

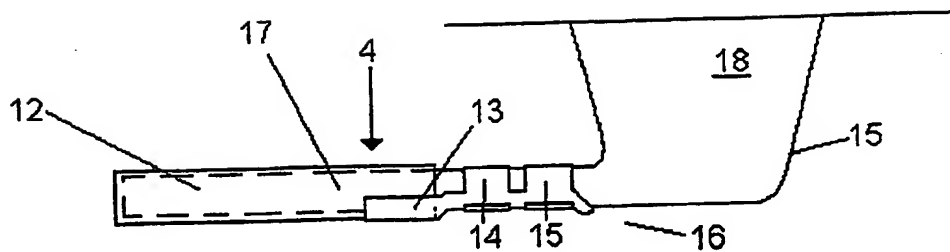
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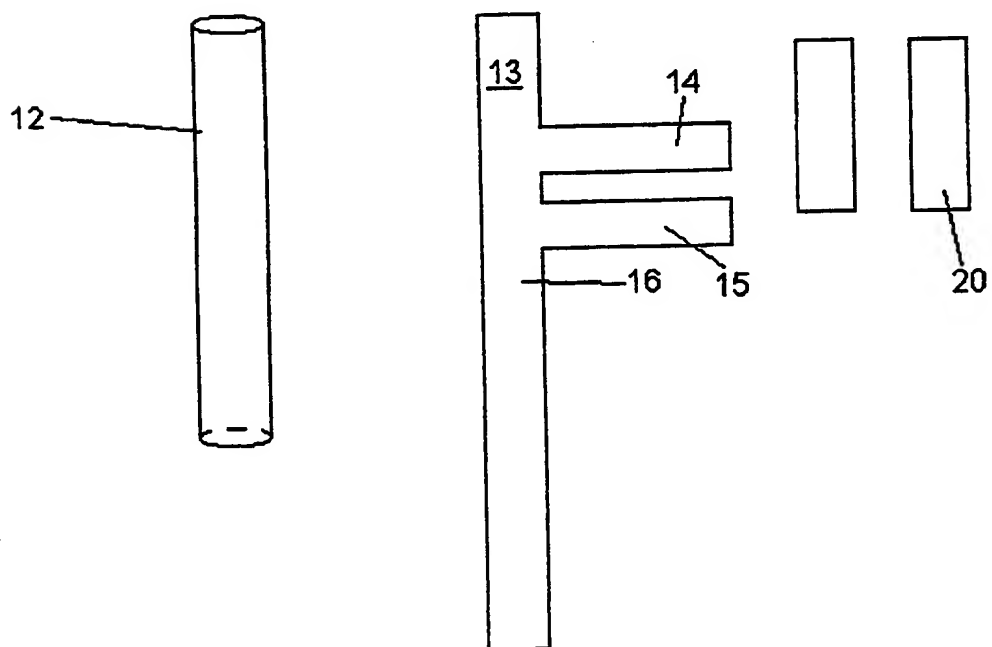


**Figure 2**





**Figure 5**



**Figure 6**

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## COVER FOR AIRCRAFT APERTURES

## DESCRIPTION

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The present invention relates to a cover for covering an aperture in a parked aircraft.

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Aircraft, for instance airliners, are provided with a number of apertures which provide communication between the atmosphere and various avionic systems including air speed indicators, altimeters and stall warning sensors. When an aircraft is on the ground, it is desirable that these apertures be sealed so as to prevent the ingress of particles of dirt, insects and rain. One system currently employed makes use of covers, cast from aluminium, which are held in place by aluminium fixing means that screw into bayonet type receptors, permanently attached to the aircraft frame.

An alternative method, which is used to protect the static port of an aircraft, comprises a flat aluminium plate which has a number of rubber prongs extending from it. The prongs are pushed into the static port  
5 holes to seal them.

These conventional covers suffer from a number of disadvantages. As these covers are only used when aircraft are used on the ground, they need to be  
10 clearly identified for removal prior to any flight. This is usually done by finishing them in a bright red colour. Paints tend to fade or dull and with use the covers become chipped and need to be repainted. Additionally, the covers are identified by means of  
15 warning flags. Such flags are attached by a ring which frequently corrodes, resulting in the need for it to be replaced. The flags themselves wear and again need to be regularly replaced.

20 The receptors for fixing the cast aluminium covers are liable to damage. If this occurs, they need to be replaced. To gain access to the damaged part it is generally necessary to remove seats, floors, internal

panels and possibly component parts of the aircraft to gain access to the damaged components. This would then be followed by several hours of engineering work.

5       The second type of cover suffers from the disadvantage that the rubber prongs sometimes break off in the static ports and are then difficult to remove.

10       Although current aircraft covers work well when used correctly and are in good order, they do need regular maintenance which requires replacement materials and expensive man working hours. As a consequence of the problems associated with conventional aircraft aperture covers, operators are tempted not to bother to use  
15       them. This can give rise to problems with aircraft avionics equipment which may then endanger life.

It is an aim of the present invention to overcome the aforementioned disadvantages of the prior art.

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According to the present invention, there is provided a cover for covering an aperture in a parked aircraft, comprising a cover portion arranged to cover an

aperture in an aircraft and a fixing portion, wherein the fixing portion alone is provided with an adhesive layer whereby the cover can be removably affixed to the aircraft. Covers according to the present invention  
5 may be produced extremely cheaply and are intended for single use. Since these covers are intended to be disposable, they avoid the maintenance problems associated with the prior art and the ease with which they can be affixed to and removed from an aircraft  
10 encourages their use even for short periods. The provision of a distinct cover portion and a fixing portion, provided with an adhesive layer, means that the adhesive is kept away from the aircraft apertures.

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Preferably, a means to assist alignment of the cover is provided. For instance, the cover portion may be transparent. This arrangement is particularly advantageous where the apertures are flush with the  
20 skin of the aircraft. Accurate positioning of the cover is important to avoid contamination of the apertures with adhesive.



Some apertures are provided in projections from the air frame, for instance pitot tubes and stall warning vanes. The present invention extends to a cover wherein the cover portion protrudes from the fixing portion so that it may enclose such a projection. The protruding cover portion will conveniently be of circular cross-section. However, it may be shaped to conform to a cross-section of the projection being covered. The height of the protrusion may also be selected with a particular projection in mind. Thus, the cover portion may be, for example, dished or substantially tubular. Conveniently, the protruding cover portion is moulded from plastics resin material.

In an embodiment, the fixing portion surrounds the cover portion. In another embodiment, the fixing portion comprises a tab.

Preferably, a warning flag portion is provided, extending from the fixing portion. The warning flag portion may be formed integrally with the fixing

portion or formed separately therefrom and thereafter fixed to it.

5 In a preferred embodiment, the fixing portion comprises an outer portion and an inner portion and a radially extending margin of the cover portion is sandwiched between said outer portion and said inner portion.

10 Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

15 Figure 1 shows the forward portion of an aircraft, provided with covers according to the present invention;

Figure 2 shows a first embodiment of a cover according to the present invention;

20 Figure 3 shows the component parts of the embodiment of Figure 2;

Figure 4 is a perspective view of a second embodiment of a cover according to the present invention;

5 Figure 5 shows a third embodiment of a cover according to the present invention in use covering a pitot tube; and

10 Figure 6 shows the component parts of the embodiment of Figure 5.

Referring to Figure 1, an aircraft 1 is provided with static ports at a location A, a stall warning vane at a location B and a pitot tube at a location C. The static ports are covered by a first cover 2. The stall  
15 warning vane is covered by a second cover 3 and the pitot tube is covered by a third cover 4.

Referring to Figure 2, the first cover 2, shown in Figure 1, comprises a ring-shaped fixing portion 5 surrounding a transparent cover portion 6. A strip 7  
20 extends radially from the fixing portion 5 to serve as a warning flag. One face of the fixing portion 5 and the corresponding face of the strip 7 are provided with

a distinctive surface decoration, for instance red or day-glo orange colouring. The other face of the ring 5 is coated with an all-weather adhesive. The adhesive is a high tack adhesive. However, its strength should be limited to that necessary to retain the cover in place during poor weather, for instance high winds.

Referring to Figure 3, the cover of Figure 2 comprises an outer element 8 which includes the strip 7 and an outer portion 5a of the fixing portion 5. The cover portion 6 comprises a disc of transparent material, the margin of which is sandwiched between the outer element 8 and a ring-shaped inner portion 5b of the fixing portion 5. The inner portion 5b is glued to the outer portion 5a. The free face of the inner portion 5a is coated with the adhesive which is in turn covered by a ring-shaped peel-off backing member 9.

In use, the peel-off backing member 9 is removed and the cover 2 is aligned with the apertures to be covered by viewing them through the cover portion 6. The fixing portion 5 is then pressed against the aircraft skin where it is retained by the adhesive.

Referring to Figure 4, the second cover 3, has a similar structure to that of the first cover 2 of Figures 2 and 3, except that the cover portion 6 is replaced by a protruding, cup-shaped cover portion 10.

5 In use, the cover portion 10 receives a projection from the aircraft fuselage such as a stall warning vane, thereby allowing the fixing portion 5 to be pressed against the aircraft's skin.

10 Referring to Figures 5 and 6, the third cover 4, comprises a transparent tubular cover portion 12, which is closed at one end, and a fixing portion 13. The fixing portion 13 comprises a tab which is glued to the open end margin of the cover portion 12. The fixing  
15 portion 13 extends axially from the open end of the cover portion 12. First and second spaced adhesive coated tabs 14, 15 extend transversely from the fixing portion. A warning flag member 16 is formed as an extension of the fixing portion 13. Respective backing  
20 members 19, 20 protect the adhesive coatings on the first and second adhesive-coated tabs 14, 15 before use.

The pitot tube 17 in Figure 5, is mounted on the fuselage of an aircraft by a support member 18 at the rear end of the pitot tube 17. In use, the cover 4 is slid over the pitot tube 17 so that the cover portion 12 shields the forward portion of the pitot tube. The backing sheet members 19, 20 are then removed and the tabs 14, 15 pressed against and circumferentially around the rear portion of the pitot tube 17. The warning flag portion 16 is left to hang free.

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The skilled man will envisage many modifications to the present invention. For instance, the cover portion will be shaped and dimensioned to accomodate the apertures or structures to be protected. The fixing portion and the warning flag may be formed from any suitable material, for instance plastics resin sheet material or card. It is also envisaged that covers according to the present invention will be provided in a kit including one cover for each feature to be covered on a particular model of aircraft.

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CLAIMS

- 5 1. A cover for covering an aperture in a parked aircraft comprising a cover portion arranged to cover an aperture in an aircraft and a fixing portion, wherein the fixing portion is provided with an adhesive layer whereby the cover can be removably affixed to an aircraft.
- 10 2. A cover according to claim 1, wherein the cover portion is transparent.
- 15 3. A cover according to claim 1 or 2, wherein the cover portion protrudes from the fixing portion.
4. A cover according to claim 3, wherein the cover portion is arranged to cover a stall warning vane.
- 20 5. A cover according to claim 3, wherein the cover portion is arranged to cover a pitot tube.

6. A cover according to claim 1, 2 or 3, wherein the fixing portion surrounds the cover portion.

5 7. A cover according to claim 1, 2 or 3, wherein the fixing portion comprises a tab.

8. A cover according to any one of claims 3, 4 or 5, wherein the cover portion is moulded from plastics resin material.

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9. A cover according to any preceding claim, including a warning flag portion extending from the fixing portion.

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8. A cover according to any preceding claim, wherein the fixing portion comprises an outer portion and an inner portion and a radially extending margin of the cover portion is sandwiched between said outer portion and said inner portion.

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10 A kit comprising a cover according to any preceding claim for each aperture to be covered on an aircraft.



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11. A method of covering an aperture on an aircraft comprising aligning a self-adhesive cover with an aperture on an aircraft and pressing the self-adhesive portions of the cover against the aircraft so as to retain the cover in place.

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12. A cover substantially as hereinbefore described with reference to the accompanying drawings.

**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

Application number

GB 9312232.3

**Relevant Technical fields**

- (i) UK CI (Edition L ) B7W - WX  
G1R - RSC, RWE
- (ii) Int CI (Edition 5 ) B64D - 45/00, 47/00, B64F 1/00  
G01F - 1/46, G01L - 19/00,  
G01P - 5/16, 5/165

**Databases (see over)**

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Search Examiner

B F BAXTER

Date of Search

3 AUGUST 1993

Documents considered relevant following a search in respect of claims 1-12

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2199501 A (MARTIN) - whole document	1,6
X	EP 0236104 A (COURTAULDS) - whole document	1,6
A	US 5127265 (WILLIAMSON ET AL)	1

SF2(p)

ms - doc99\fil001940

Category	Identity of document and relevant passages - 15 -	Relevant to claim(s)

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